

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BOX: PATENT APPLICATION

Applicants: Mahendran, Mailvaganam; Goodboy, Kenneth P., et al.

Application's Title: HOLLOW FIBER MEMBRANE AND BRAIDED TUBULAR
SUPPORT THEREFOR

Serial No.:

Filed:

Group Art Unit: 1723

Examiners: Ana Fortuna & Richard Ward

Docket No.: ZEN-9801A

4 January 2002

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents

Washington, D.C. 20231.

Sir:

Please amend the above-identified patent application as follows:

IN THE SPECIFICATION:

pg 8, replace the paragraph starting at line 8 with the following paragraph:

Though a "shrink test" is commonly conducted on yarns by heat shrinking in water at 98°C via a Texurmat boil off; or, in dry air at 177°C with 0.045 gf/dtex tension for 2 min (DuPont); or, in dry air at 190°C with 0.135 gf/d for 30 sec (Monsanto), to date there has been no reason to heat pre-shrink any tubular braid of synthetic resin, prior to its being coated with polymer for the stated purpose of this invention, namely to make outside-in hollow fiber microfiltration and ultrafiltration asymmetric membranes. More particularly, since a braid woven with glass fiber is essentially non-heat-shrinkable, there has been no reason to provide a stable length of a polyester or nylon tubular braid by pre-shrinking it so that its shrunk length is about 84% of its pre-shrunk length at the same time ensuring that the braid retains at least 95% of its tensile strength.

IN THE CLAIMS:

Cancel claims 1 - 8.

Rewrite claims 9 and 14 as follows:

9. An outside-in hollow fiber asymmetric membrane comprising a flexible macroporous tubular braid support having a tubular film of synthetic resinous material supported on the outer circumferential surface of the braid without the support being embedded in the film which has a wall thickness of less than 0.2 mm, the braid comprising, from about 16 to 60 separate yarns, each on its own carrier, each yarn using multifilament 150 to 500 denier (gm/9000 meters) yarn, each multifilament being made with from 25 to 750 filaments, each filament being from 0.5 to 7 denier, the braid being woven with from 1 to 3 multifilament ends at from 30 to 45 picks (crosses/inch), the braid having a stable heat-pre-shrunk length which is in the range from about 1% to 20% less than its unshrunk length, an air permeability in the range from about 1 to about 10 cc/sec/cm² at 1.378 kPa, and extension at break of the pre-shrunk braid is at least 10%, such that the membrane is adapted for use as a microfiltration or ultrafiltration liquid separation membrane.

14. In an outside-in hollow fiber asymmetric semipermeable membrane comprising,

- (i) a macroporous foraminous tubular support means having an outer surface; and,
- (ii) a polymeric film of asymmetric semipermeable membrane;

said film being supported by said outer surface, and said film having a peripheral barrier layer or "skin" integral with successive microporous layers in open communication with each other,

the improvement comprising,

a flexible macroporous tubular braid support comprising from about 16 to 60 separate yarns, each on its own carrier, each yarn using multifilament 150 to 500 denier (gm/9000 meters) yarn, each multifilament being made with from 25 to 750 filaments,


each filament being from 0.5 to 7 denier, said braid being woven with from 1 to 3 multifilament ends at from 30 to 45 picks (crosses/inch), being stable heat-pre-shrunk length which is in the range from about 1% to 20% less than its unshrunk length, and having an air permeability less than 10 cc/sec/cm² at 1.378 kPa, whereby said membrane is adapted for use as a microfiltration or ultrafiltration liquid separation membrane.

REMARKS

The amendment to the specification was made in the parent case and introduces no new matter. The original paragraph 8, showing the amendment made, is presented in the Appendix attached hereto.

The rewritten claims 9 and 14 are broader than the claims submitted in the parent case but the broadening of scope does not interfere with the patentability of the claims. As stated in the Examiner's reason for allowance in the parent, the patentability of claims 8 and 9 is based on their distinguishing over Brun et al (U.S. Patent No. 3,948,781) the closest prior art. The claims 14 - 19 were allowed upon filing a terminal disclaimer disclaiming the terminal part of the statutory term of U.S. Patent No. 5,914,039 issued June 22, 1999.

Respectfully submitted,



Alfred D. Lobo (Reg. No. 24,109)

CERTIFICATE UNDER 35 U.S.C. 1.10

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APPENDIX

The amendment in the text of the paragraph starting at line 8 of pg 8 of the specification, is shown as the underlined portion below:

Though a "shrink test" is commonly conducted on yarns by heat shrinking in water at 98°C via a Texurmat boil off; or, in dry air at 177°C with 0.045 gf/dtex tension for 2 min (DuPont); or, in dry air at 190°C with 0.135 gf/d for 30 sec (Monsanto), to date there has been no reason to heat pre-shrink any tubular braid of synthetic resin, prior to its being coated with polymer for the stated purpose of this invention, namely to make outside-in hollow fiber microfiltration and ultrafiltration asymmetric membranes. More particularly, since a braid woven with glass fiber is essentially non-heat-shrinkable, there has been no reason to provide a stable length of a polyester or nylon tubular braid by pre-shrinking it so that its shrunk length is about 84% of its pre-shrunk length at the same time ensuring that the braid retains at least 95% of its tensile strength.